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We claim:

1. Use of *Mycobacterium phlei* DNA (M-DNA) and a chemotherapeutic agent (M-DNA + chemotherapeutic agent) in the manufacture of a medicament to treat a cancer in an animal.
- 5 2. Use of M-DNA preserved and complexed on *Mycobacterium phlei* cell wall (MCC) and a chemotherapeutic agent (MCC + chemotherapeutic agent) in the manufacture of a medicament to treat a cancer in an animal.
- 10 3. The use according to claim 1 or 2, wherein the chemotherapeutic agent is selected from the group consisting of DNA cross-linking agents, DNA depolymerizing agents and antimetabolic agents.
4. The use according to claim 1, 2, or 3 wherein the M-DNA + chemotherapeutic agent and MCC + chemotherapeutic agent induce cell cycle arrest in cells of the cancer.
5. The use according to claim 1, 2, or 3 wherein the M-DNA + chemotherapeutic agent and the MCC + chemotherapeutic agent inhibit proliferation of cells in the cancer.
- 15 6. The use according to claim 1, 2, or 3 wherein the M-DNA + chemotherapeutic agent and MCC + chemotherapeutic agent induces apoptosis in cells of the cancer.
7. The use according to anyone of claims 1-6, wherein the cancer is selected from the group consisting of leukemia, lymphoma and melanoma.
8. The use according to claim 7, wherein the cancer is melanoma.
- 20 9. Use of M-DNA in the manufacture of a medicament to induce cell cycle arrest in cancer cells in an animal.
10. Use of MCC in the manufacture of a medicament to induce cell cycle arrest in cancer cells in an animal.
- 25 11. The use according to claim 9 or 10, wherein the cell cycle arrest in the cancer cells is induced at phase S1-GM2 of the cell cycle.
12. Use of M-DNA in the manufacture of a medicament to activate caspase activity in

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cancer cells in an animal.

13. Use of MCC in the manufacture of a medicament to activate caspase activity in cancer cells in an animal.

14. The use according to any one of claims 9, 10, 11, 12 or 13, wherein the cancer cells
5 are melanoma cells.

15. Use of M-DNA for the manufacture of a medicament to treat melanoma in an animal having melanoma.

16. Use of MCC for the manufacture of a medicament to treat melanoma in an animal having melanoma.

10 17. A composition comprising M-DNA and a chemotherapeutic agent, wherein the M-DNA potentiates the anti-cancer activity of the chemotherapeutic agent in treating cancer in an animal having cancer.

15 18. A composition comprising MCC and a chemotherapeutic agent, wherein the MCC potentiates the anti-cancer activity of the chemotherapeutic agent in treating cancer in an animal having cancer.

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